



# PUMA VT series

## PUMA VT450/750/900/1100

High Performance Vertical Turning Center



Do

or the Future

# **PUMA VT series**

## **PUMA VT450 / 750 / 900 / 1100**

The vertical turning center is designed for long term accuracy, heavy duty cutting and to minimize floor space. Its powerful spindle drives, meehanite casting and integral box guide way provide unsurpassed rigidity.



**New standard for unsurpassed high productivity,  
high speed and high precision**



## Basic Mechanism

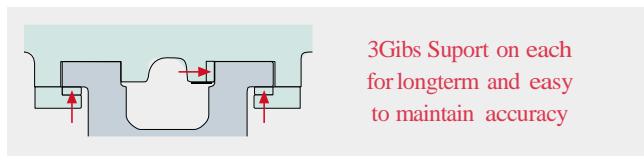


### Robust Bed Construction

In order to assure heavy duty machining and optimized chip flow, the machine base body is designed and streamlined. Its small foot print help you systemizing your manufacturing plan plot in your factory.

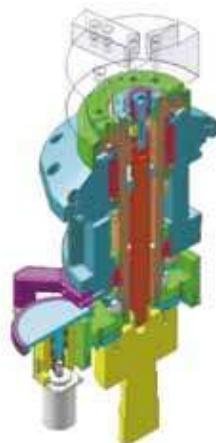
### Robust Column Construction

The wide hardened and ground box ways reduce vibration promoting better tool life and surface finishes. The box ways are turcite coated which allows for 787 ipm rapid traverse rates. The Balanced Counter Weight located inside the column, neutralizes the gravity effect on the Vertical slide. It will also conserve electricity and prevent Turret Drop while in Emergency stop or Power failure. All axis Slides are Induction Hardened and Ground Hrc 55 Hardness. Long-term Accuracies are very basic requirements on Doosan Infracore products. 3 adjustable Gibs on each Axis slide are provided to maintain original accuracy.



### High Performance Spindle & Turret

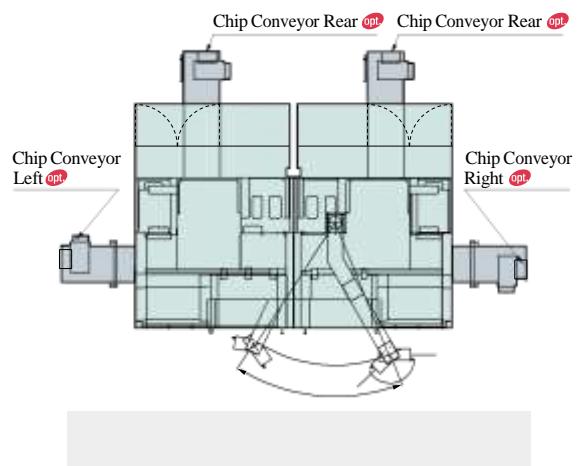
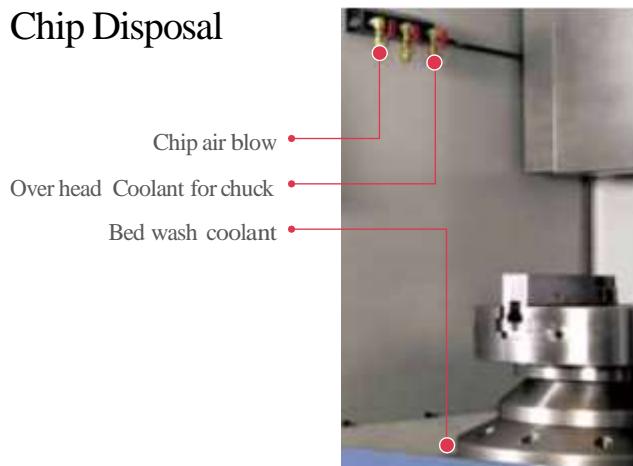
The spindle is supported by a double row of tapered roller bearings in the Top and Bottom of the spindle while angular thrust bearings provide tremendous radial load capability. The Cartridge Spindle is axial symmetric construction, which provides very stable accuracy all day-long even when the spindle is heated up by continuous operation.



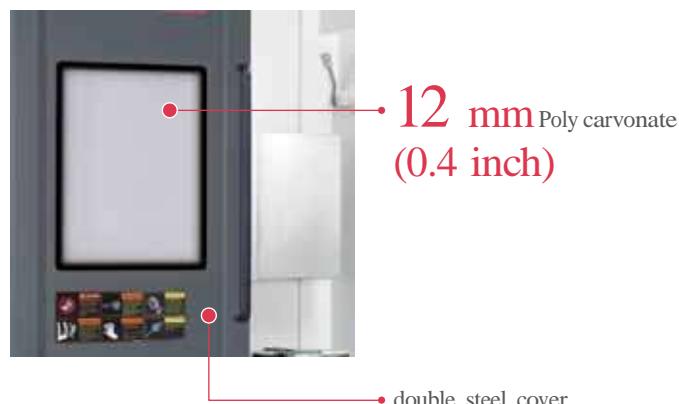
V12 Turret is ground finish for Zero accuracy. Turret has large Three piece curvic couplings. of clamping force so high accuracy and heavy-duty cutting can be achieved. The 12 station turret holds ID or OD tools.



## Chip Disposal



## Safety Cover



## Easy Operation



The swing arm on the Main Operation panel is a userfriendly feature to minimize the distance from Part to operator's Panel during setup. Narrow Vertical panel is space saving design. The handy Sub Operation Panel beside Door for each spindle has Cycle start, Feed hold, Emergency stop, Door Open/close switches.



## Accessories



Gear box **opt.**  
PUMA VT900 / VT1100 **std.**



Auto door **opt.**  
Pneumatic cylinder



Manual tool setter **opt.**  
Removable type, Renishaw

# PUMA VT450

VT450 / VT450M / VT450-2SP / VT450M-2SP



Max. spindle speed

**2500 r/min**

Motor (30 min)

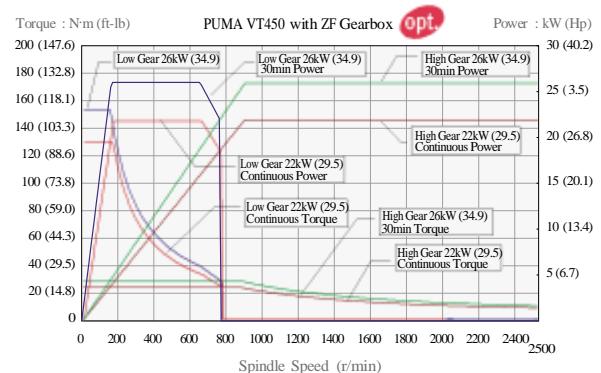
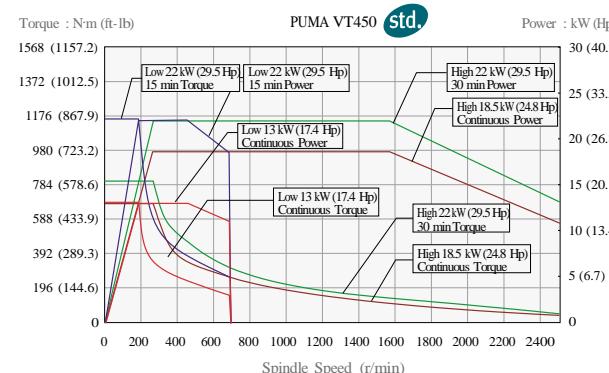
**22 kW (29.5 Hp)**

## Main Specification std.

|                                |             |  |
|--------------------------------|-------------|--|
| Travels (X / Z axis)           | mm (inch)   | 240 / 450 (9.4 / 17.7)                       |
| Chuck size                     | mm (inch)   | 305 (12.0)                                   |
| Max. Spindle speed             | r/min       | 2500   |
| Spindle motor (Cont. / 15min.) | kW (Hp)     | 18.5 / 22 (24.8 / 29.5)                      |
| Rapid Traverse (X / Z axis)    | m/min (ipm) | 20 / 20 (787.4 / 787.4)                      |
| Turret index time              | s           | 1.6 (PUMA VT450)                             |
| No. of tool station            | stations    | 12   |
| Std. M/C dimension (L x W x H) | mm (inch)   | 1445 x 2491 x 3009<br>(56.9 x 98.1 x 118.5)* |
| Machine weight                 | kg (lb)     | 6200 kg (13668.5 lb)*                        |

\* : PUMA VT450 / VT450M

## Main Spindle Power-torque Diagram



# PUMA VT750

VT750 / VT750M / VT750-2SP / VT750M-2SP



## Main Specification std.

|                                |             |   |
|--------------------------------|-------------|---|
| Travels (X / Z axis)           | mm (inch)   | 385 / 760 (15.2 / 29.9)                       |
| Chuck size                     | mm (inch)   | 381 (15.0)                                    |
| Max. Spindle speed             | r/min       | 2000  |
| Spindle motor (Cont. / 30min.) | kW (Hp)     | 22 / 30 (29.5 / 40.2)                         |
| Rapid Traverse (X / Z axis)    | m/min (ipm) | 20 / 20 (787.4)                               |
| Turret index time              | s           | 1.8 (PUMA VT750)                              |
| No. of tool station            | stations    | 12  |
| Std. M/C dimension (L x W x H) | mm (inch)   | 1850 x 2785 x 3450*<br>(72.8 x 109.6 x 135.8) |
| Machine weight                 | kg (lb)     | 9700 (21384.5)*                               |

Max. spindle speed

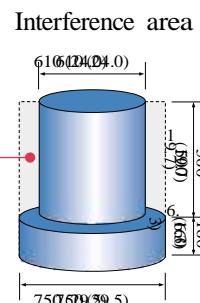
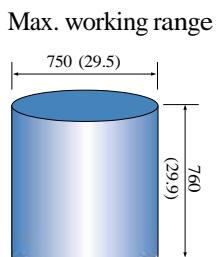
**2000 r/min**

Motor(30 min)

**30 kW (40.2 Hp)**

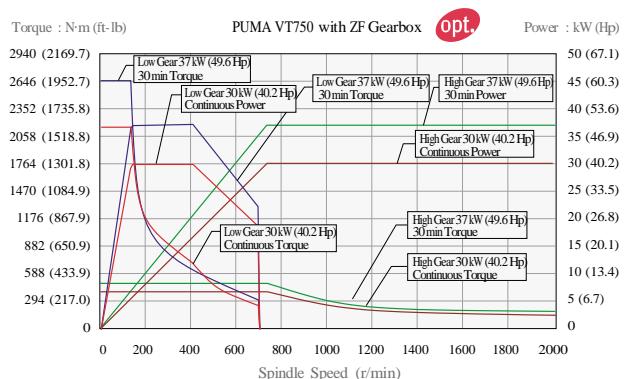
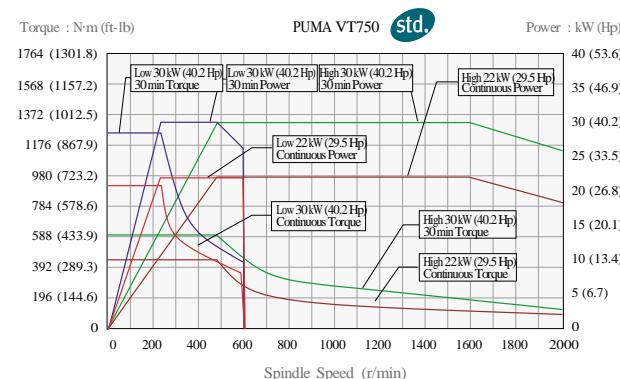
## Working Range

unit : mm (inch)



If working length 160mm (6.3 inch) excess, interference area

## Main Spindle Power-torque Diagram



# PUMA VT900

VT900 / VT900M / VT900-2SP / VT900M-2SP



Max. spindle speed

**1800 r/min**

Motor(30 min)

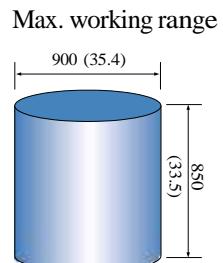
**45 kW (60.3 Hp)**

|                                |             |   |
|--------------------------------|-------------|---|
| Travels (X / Z axis)           | mm (inch)   | 470 / 850 (18.5 / 33.5)                       |
| Chuck size                     | mm (inch)   | 610 (24.0)                                    |
| Max. Spindle speed             | r/min       | 1800  |
| Spindle motor (Cont. / 15min.) | kW (Hp)     | 37 / 45                                       |
| Rapid Traverse (X / Z axis)    | m/min (ipm) | 20 / 20 (787.4 / 787.4)                       |
| Turret index time              | s           | 2.0 (PUMA VT900)                              |
| No. of tool station            | stations    | 12  |
| Std. M/C dimension (L x W x H) | mm (inch)   | 2130 x 3050 x 3621*<br>(83.9 x 120.1 x 142.6) |
| Machine weight                 | kg (lb)     | 12500 (2755.7)*                               |

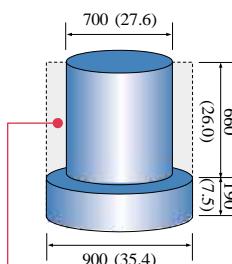
\* : PUMA VT900 / VT900M

**Working Range**

unit : mm (inch)

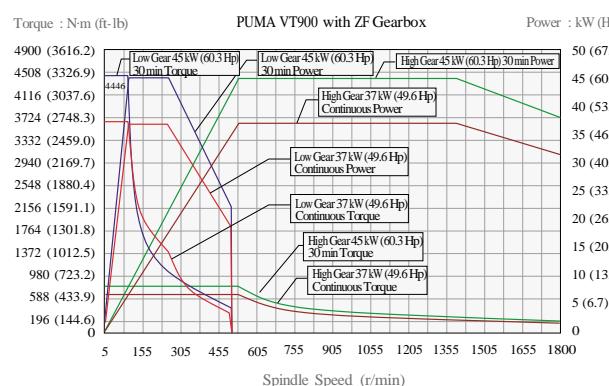


**Interference area**



If working length 190mm (7.5 inch)  
excess, interference area

## Main Spindle Power-torque Diagram



# PUMA VT1100

## VT1100 / VT1100M



### Main Specification std.

|  |             |   |
|--|-------------|---|
| Travels (X / Z axis)                   | mm (inch)   | 580 / 1000 (22.8 / 39.4)                      |
| Chuck size                             | mm (inch)   | 800 (31.5)                                    |
| Max. Spindle speed                     | r/min       | 850   |
| Spindle motor<br>(Cont./30min./10min.) | kW (Hp)     | 45 / 55 / 60 (60.3 / 73.8 / 80.5)             |
| Rapid Traverse (X / Z axis)            | m/min (ipm) | 20 / 20 (787.4 / 787.4)                       |
| Turret index time                      | s           | 2.2   |
| No. of tool station                    | stations    | 12  |
| Std. M/C dimension (L x W x H)         | mm (inch)   | 2850 x 3305 x 4012<br>(112.2 x 130.1 x 158.0) |
| Machine weight                         | kg (lb)     | 22000 (48501.0)                               |

Max. spindle speed

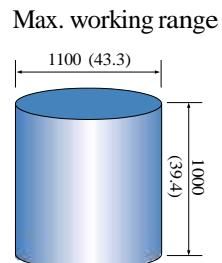
**850 r/min**

Motor(30 min)

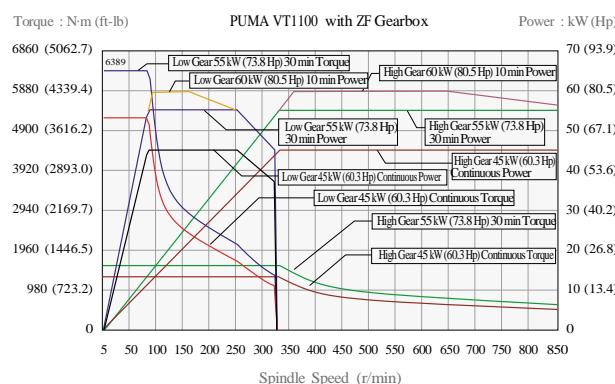
**60 kW (80.5 Hp)**

### Working Range

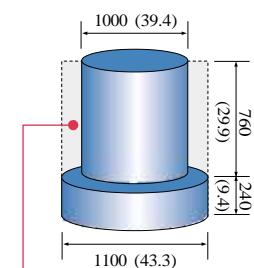
unit : mm (inch)



### Main Spindle Power-torque Diagram



### Interference area

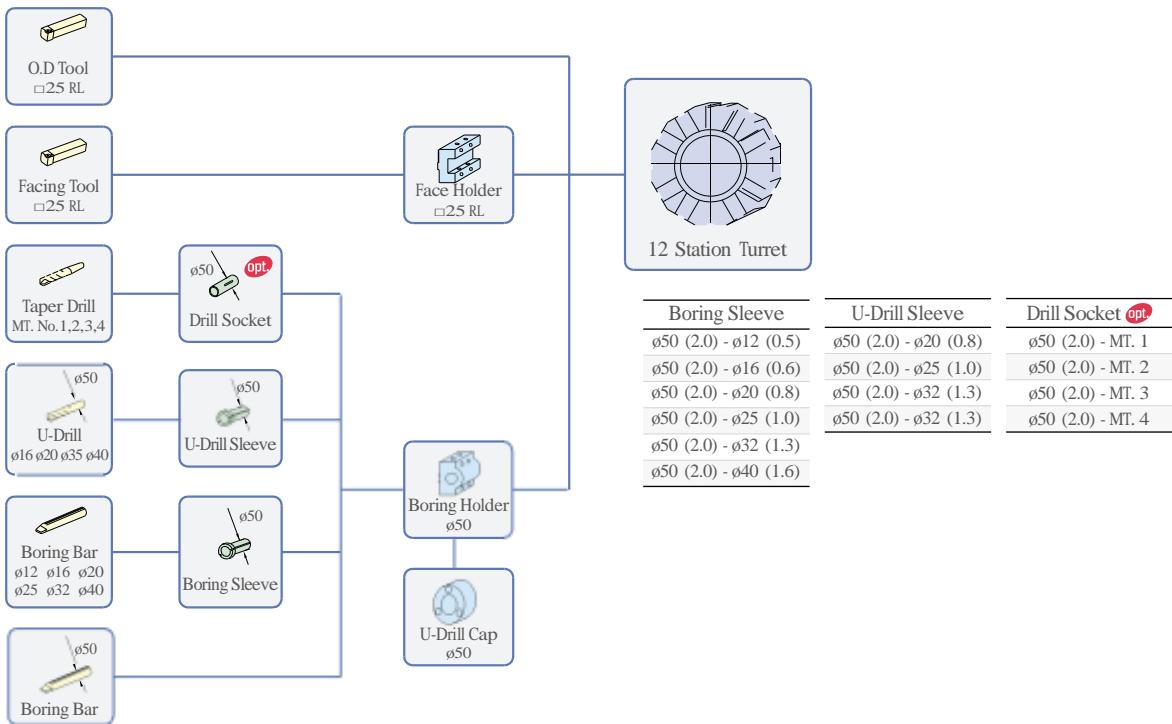


If working length 240mm (9.4 inch)  
excess, interference area

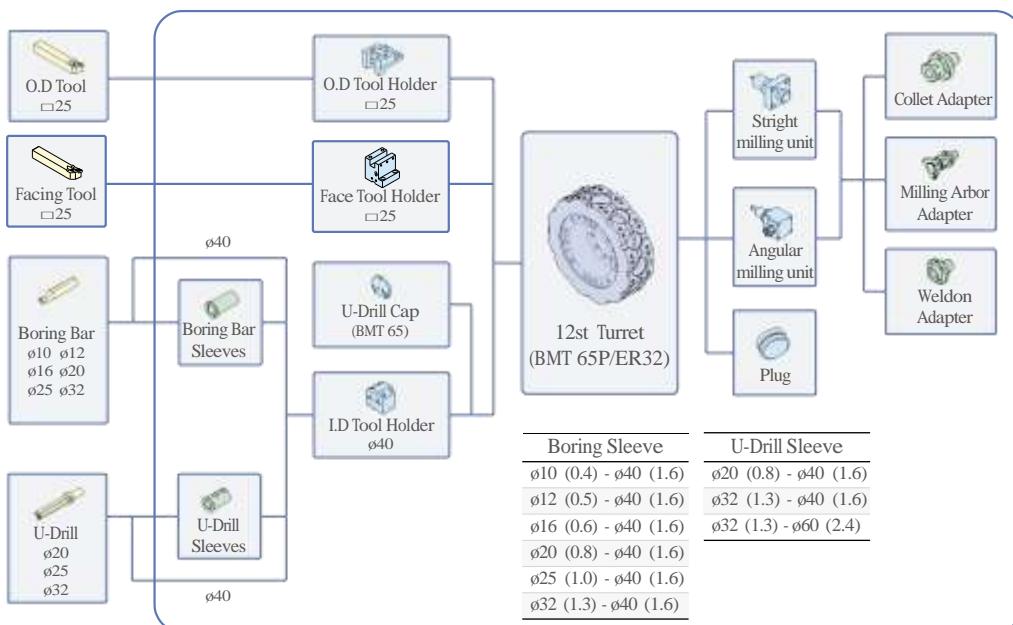
# Tooling System

## PUMA VT450 / VT450-2SP

Unit: mm (inch)



## PUMA VT450M / VT450M-2SP

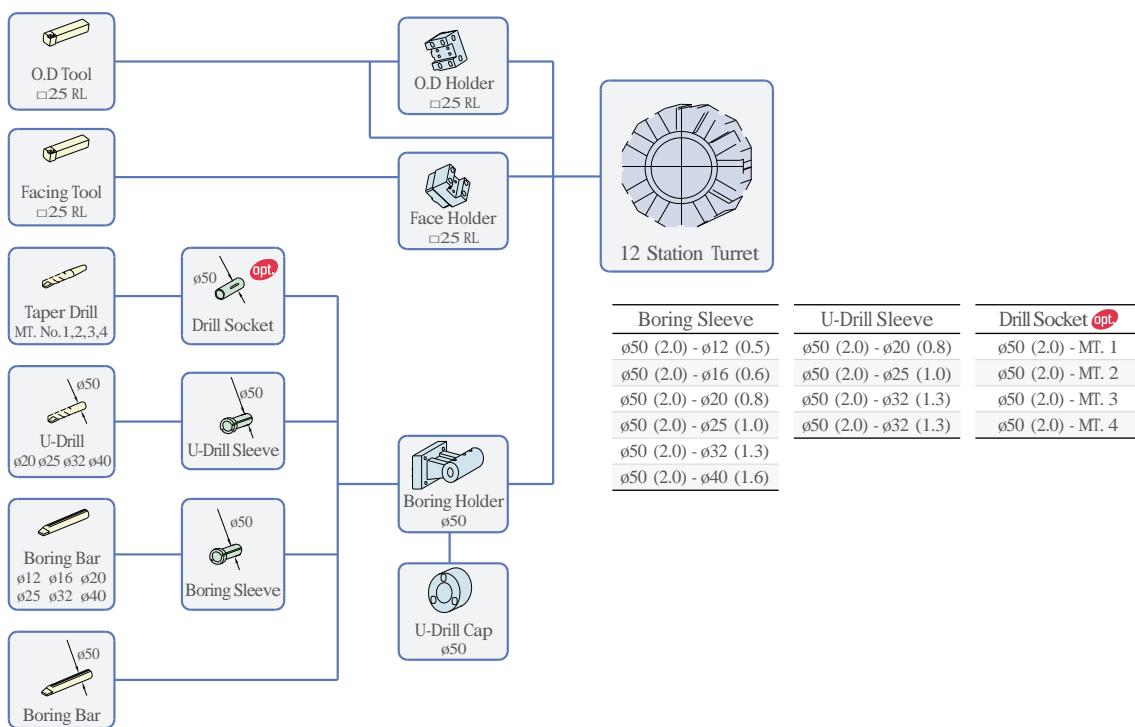


Note) Above tooling system is our recommendation.

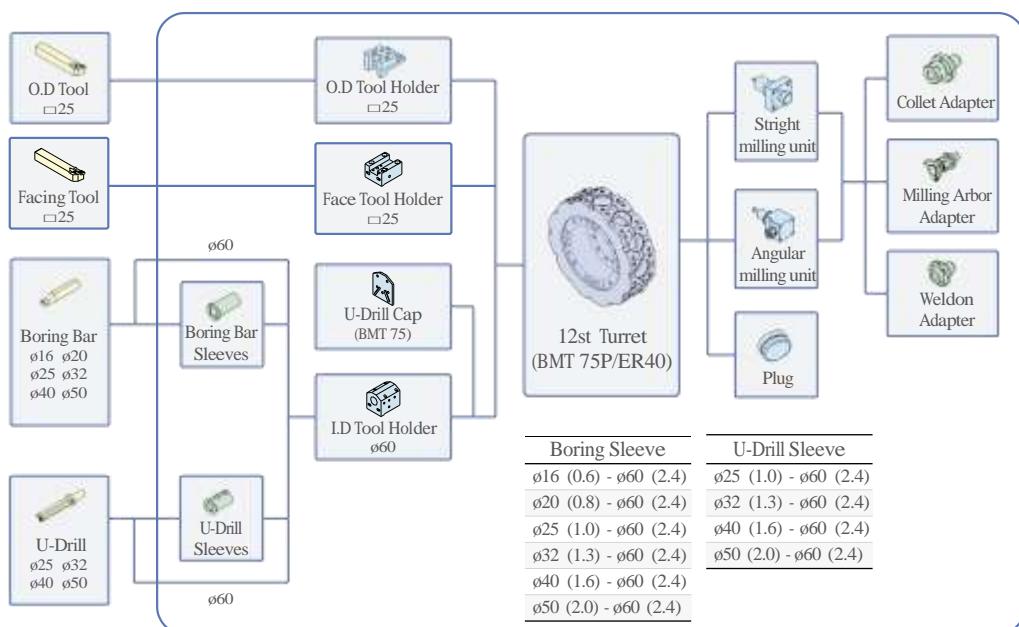
Depending on export condition, the standard tooling packed with the machine can be different.

## PUMA VT750 / VT750-2SP

Unit: mm (inch)



## PUMA VT750M / VT750M-2SP



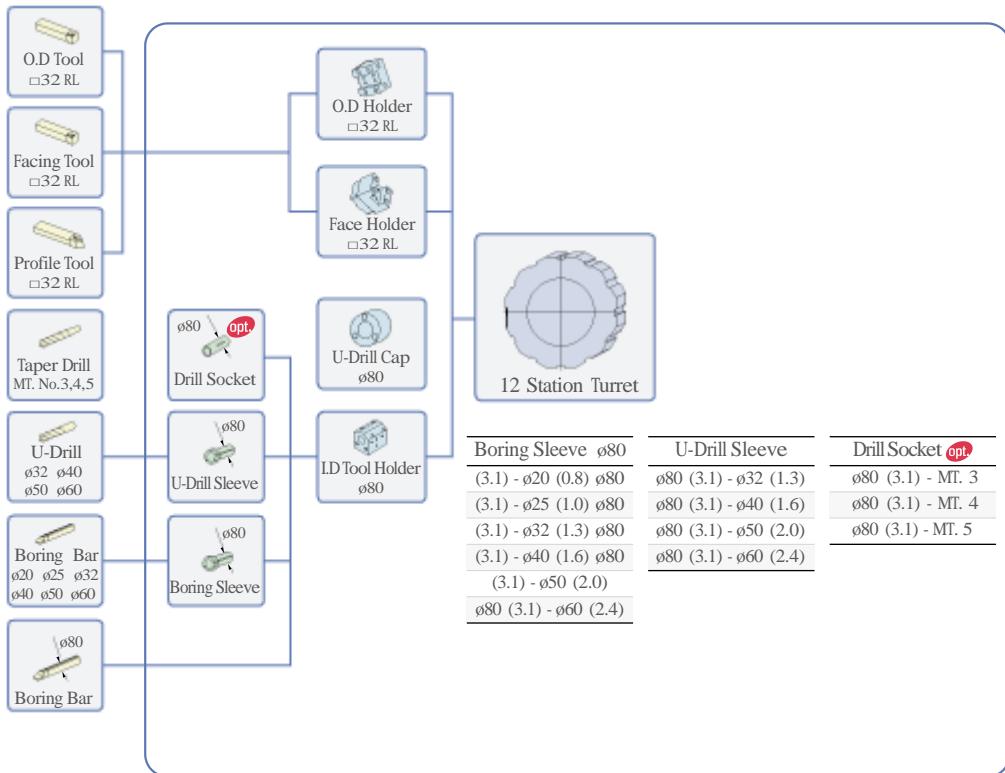
Note) Above tooling system is our recommendation.

Depending on export condition, the standard tooling packed with the machine can be different.

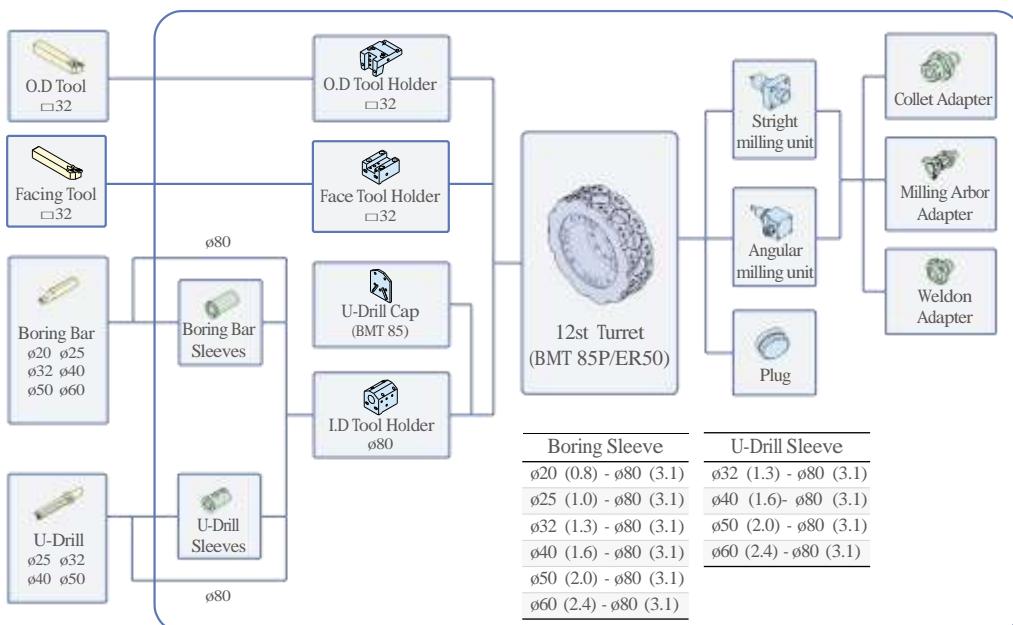
# Tooling System

## PUMA VT900 / VT900-2SP

Unit: mm (inch)



## PUMA VT900M / VT900M-2SP

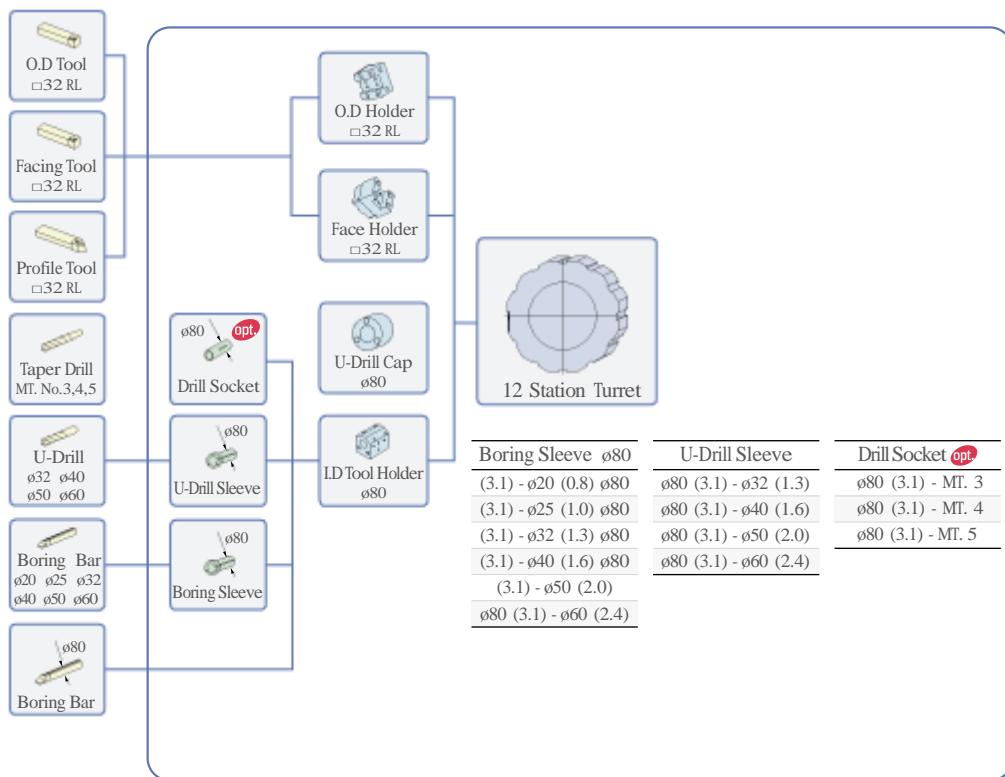


Note) Above tooling system is our recommendation.

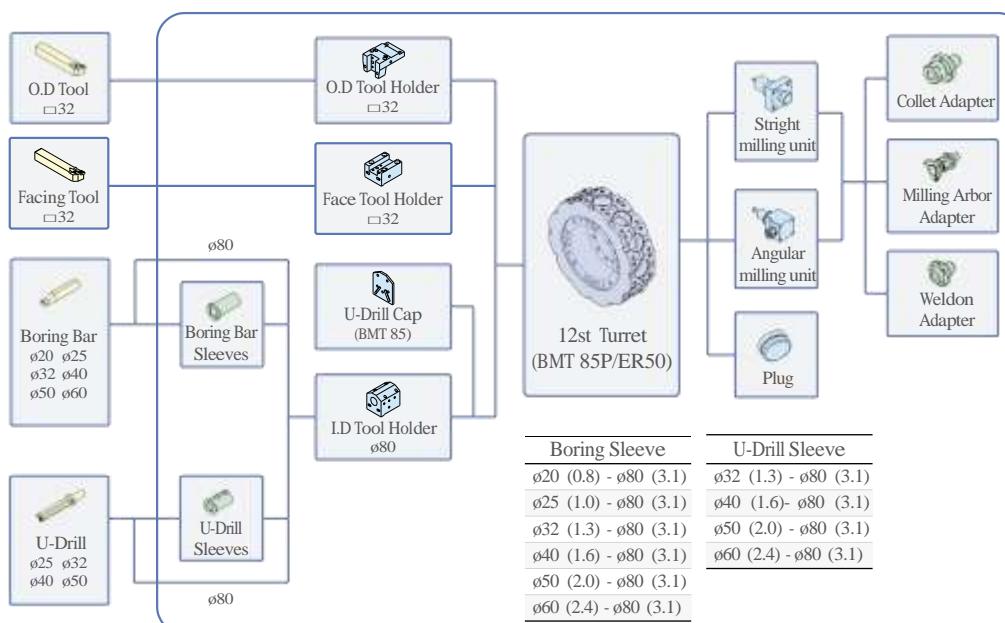
Depending on export condition, the standard tooling packed with the machine can be different.

## PUMA VT1100

Unit: mm (inch)



## PUMA VT1100M

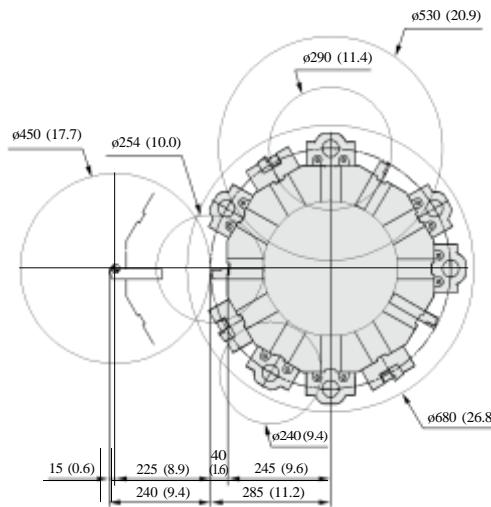


Note) Above tooling system is our recommendation.

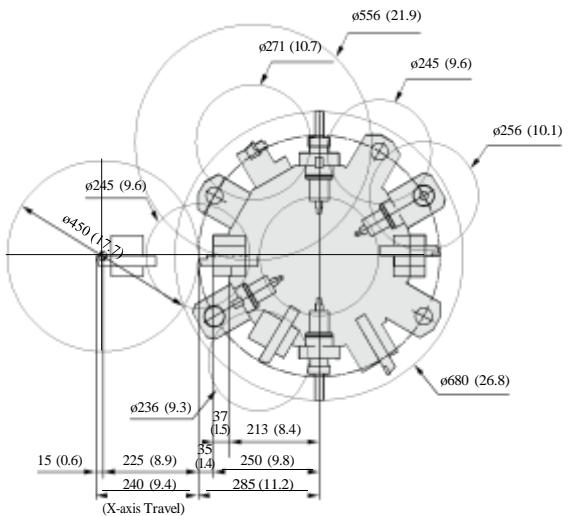
Depending on export condition, the standard tooling packed with the machine can be different.

# Tool Interference Diagram

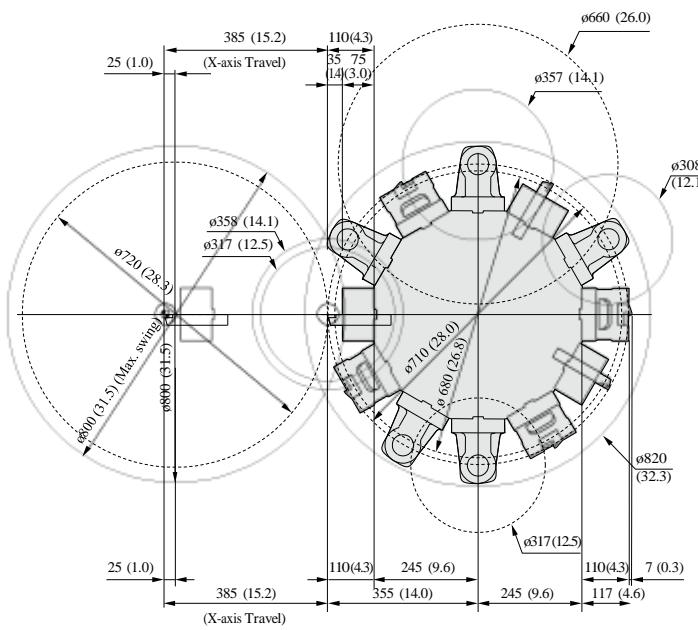
## PUMA VT450 / VT450-2SP



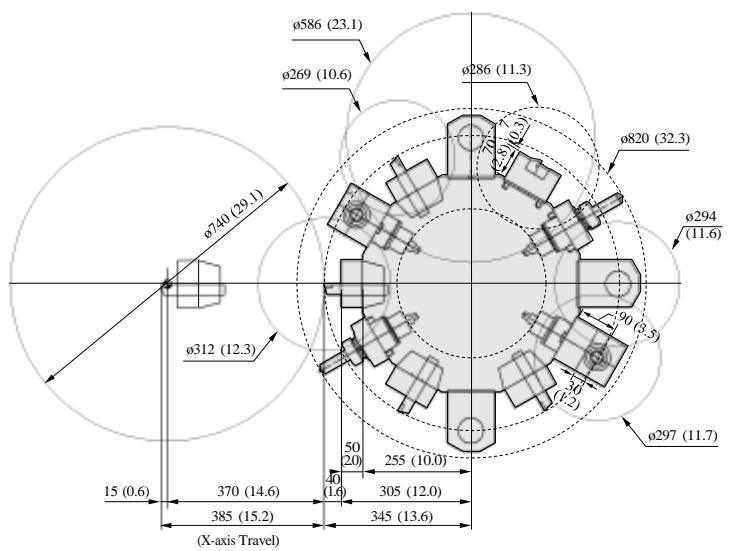
## PUMA VT450M / VT450M-2SP



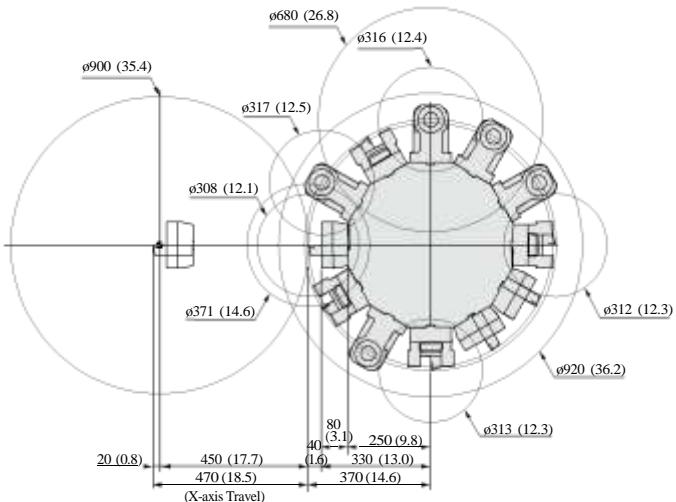
## PUMA VT750 / VT750-2SP



## PUMA VT750M / VT750M-2SP

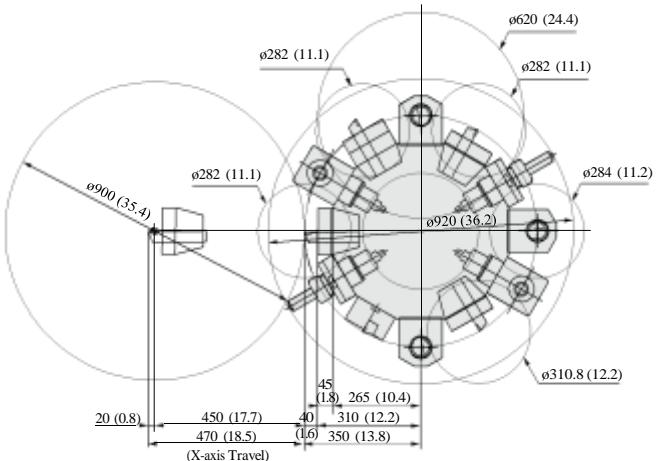


## PUMA VT900 / VT900-2SP

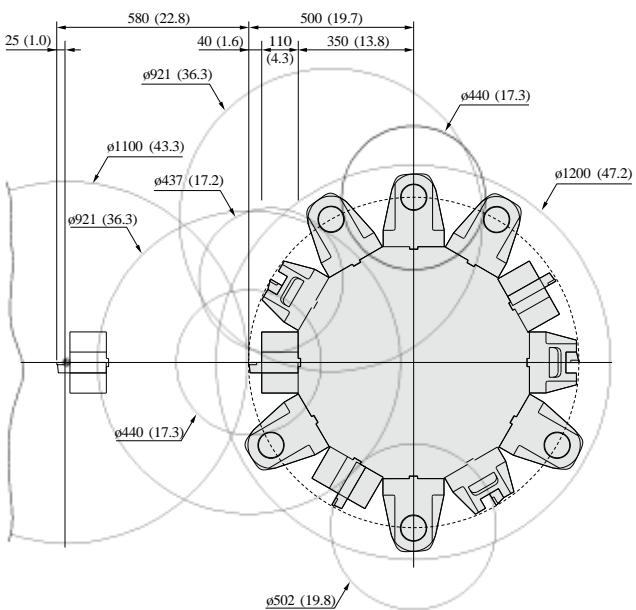


PUMA VT900M / VT900M-2SP

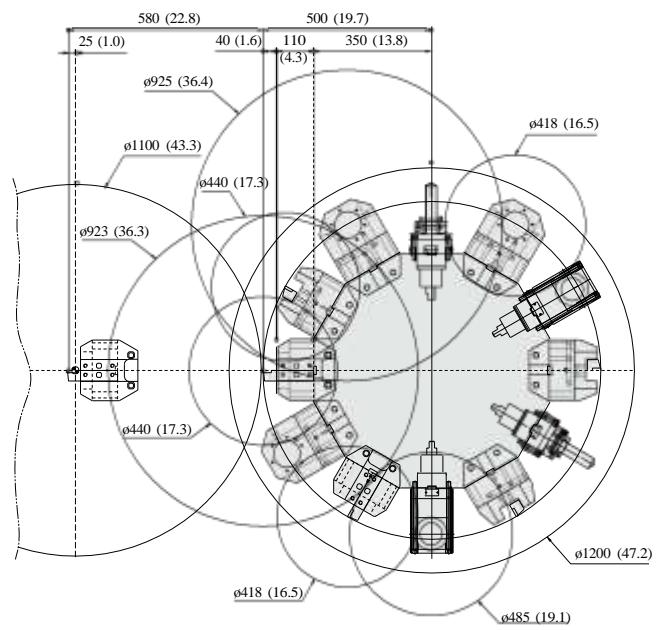
Unit: mm (inch)



PUMA VT1100

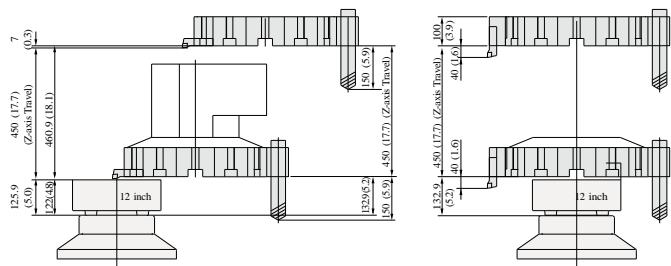


## PUMA VT1100M

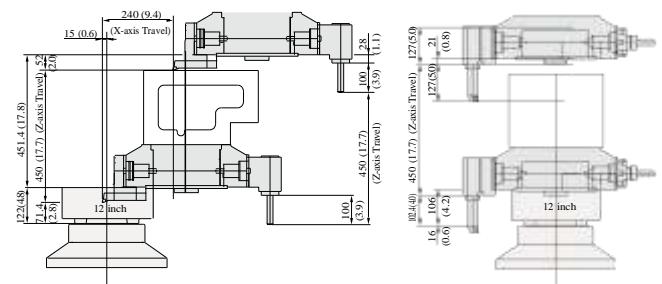


# Working Range

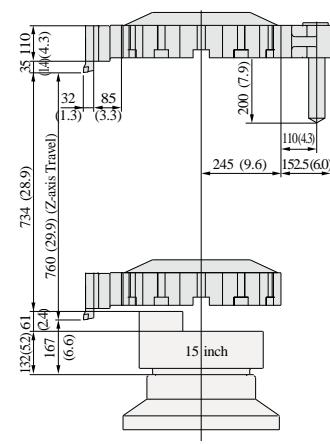
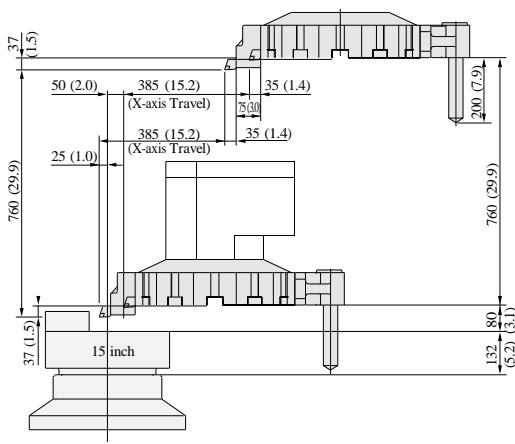
PUMA VT450 / VT450-2SP



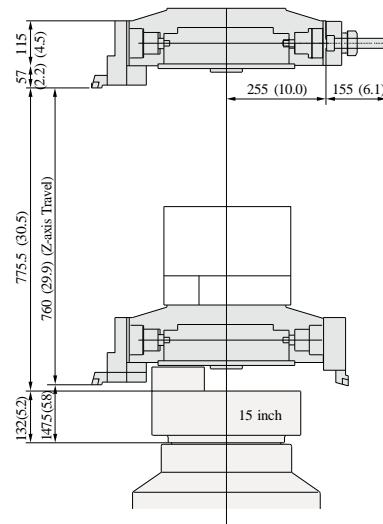
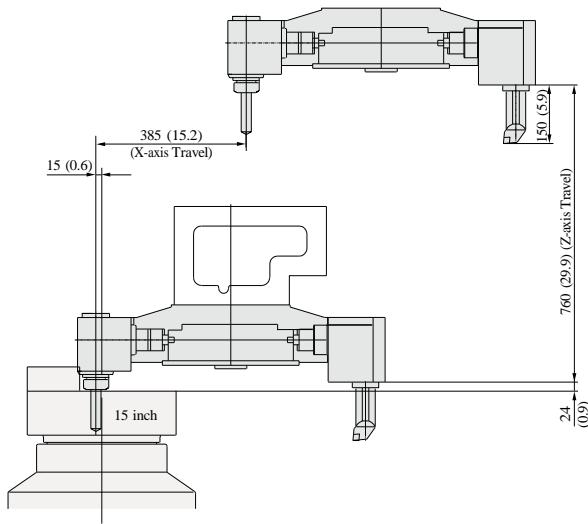
PUMA VT450M / VT450M-2SP



PUMA VT750 / VT750-2SP

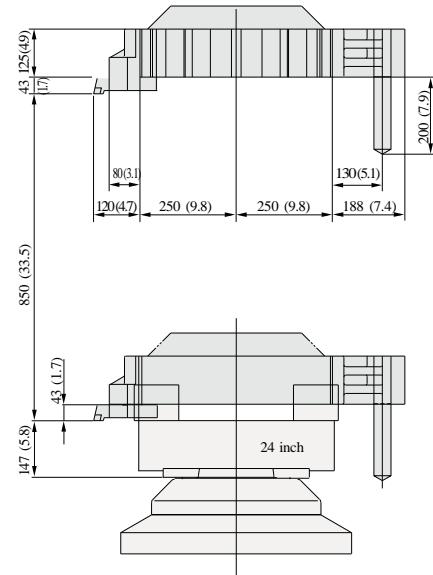
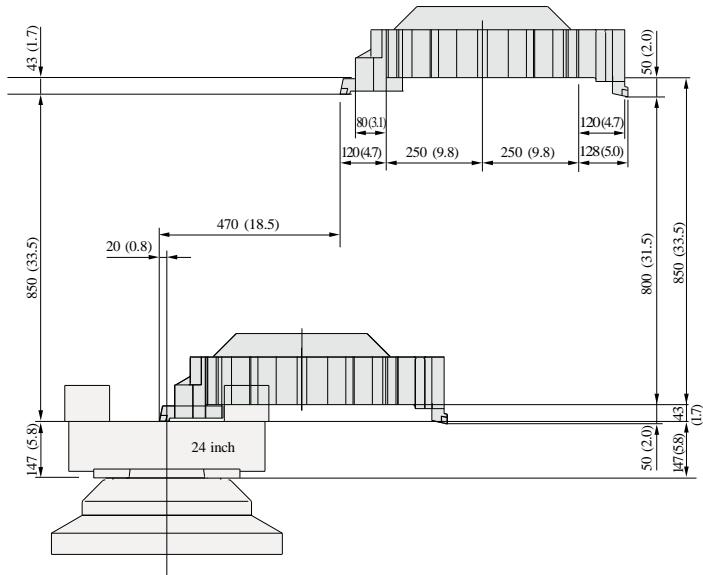


PUMA VT750M / VT750M-2SP

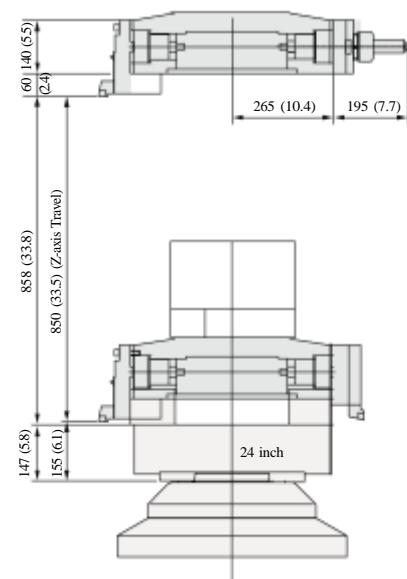
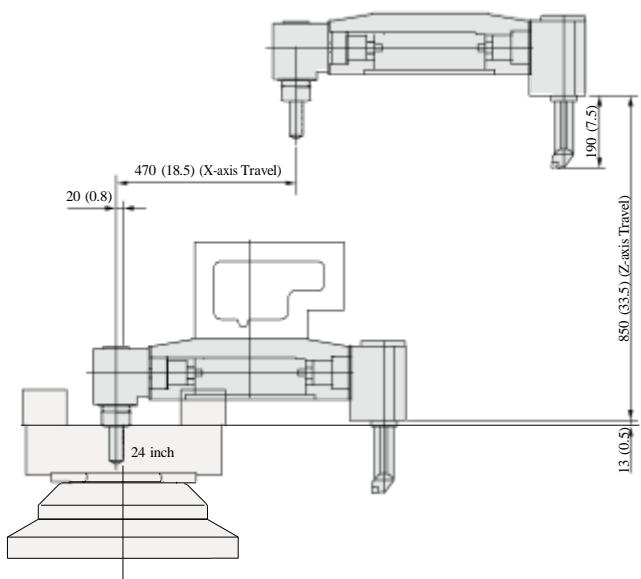


## PUMA VT900 / VT900-2SP

Unit: mm (inch)



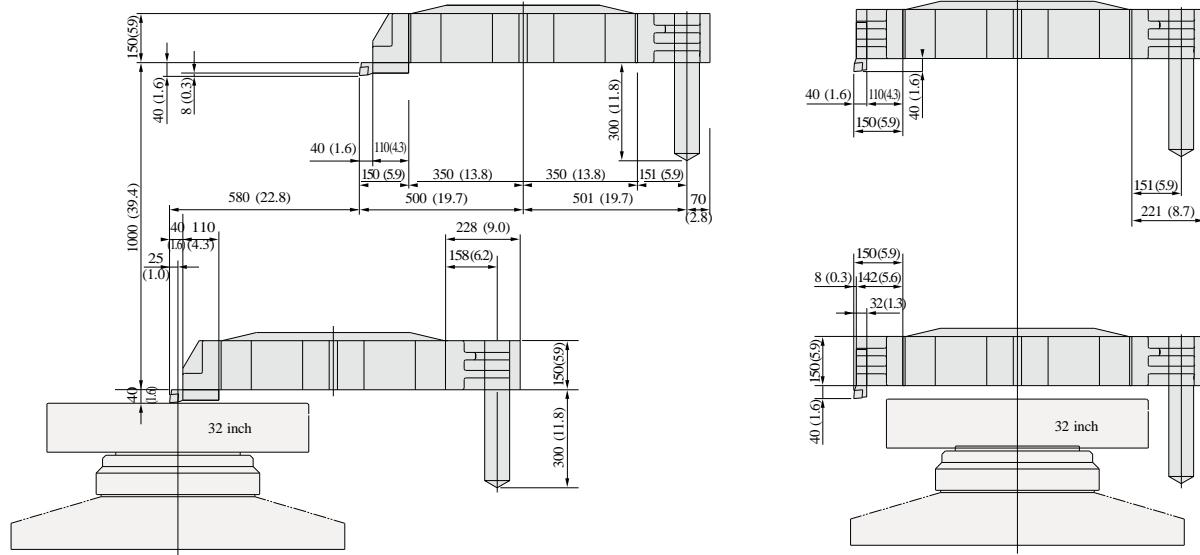
## PUMA VT900M / VT900M-2SP



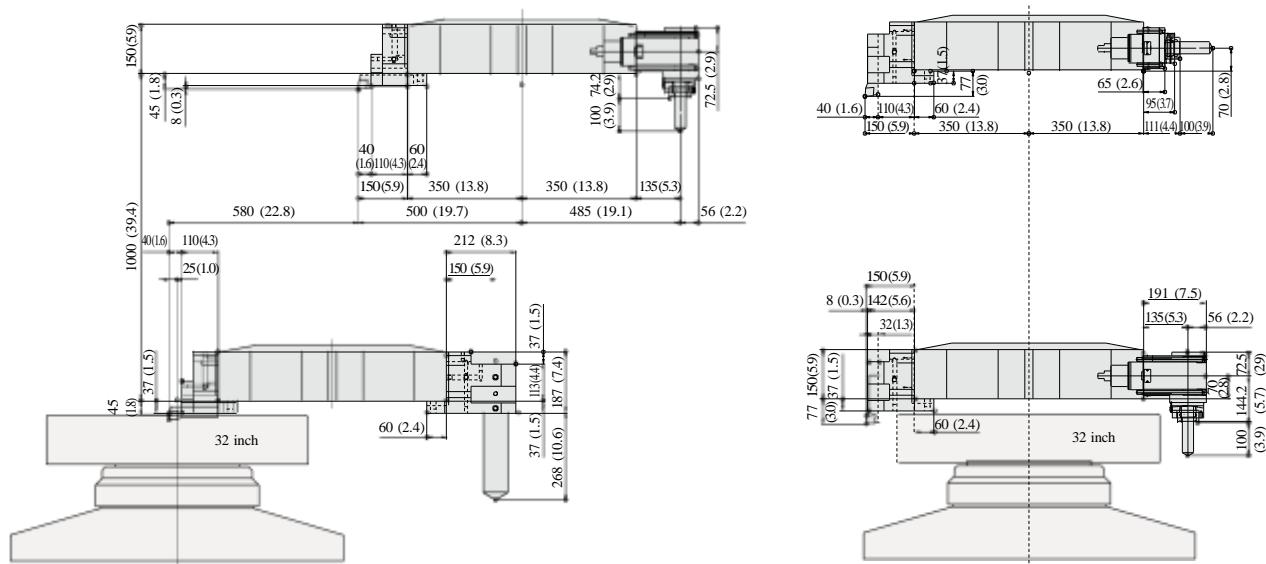
## Working Range

PUMA VT1100

Unit: mm (inch)



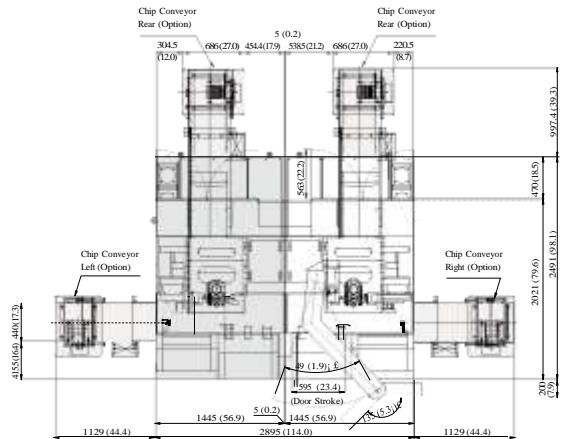
## PUMA VT1100M



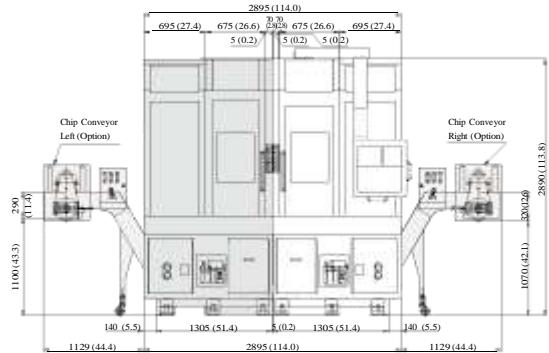
## External Dimensions

PUMA VT450 / VT450M /  
PUMA VT450-2SP / VT450M-2SP

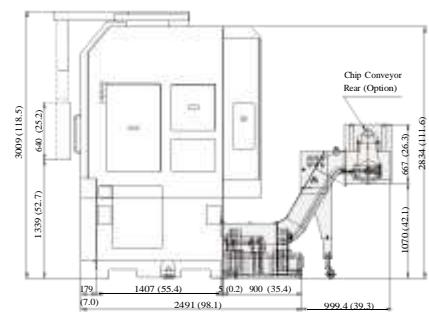
## Top View



### Front View



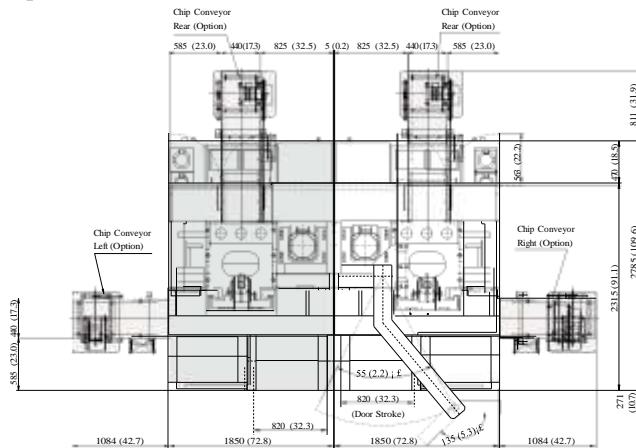
### Side View



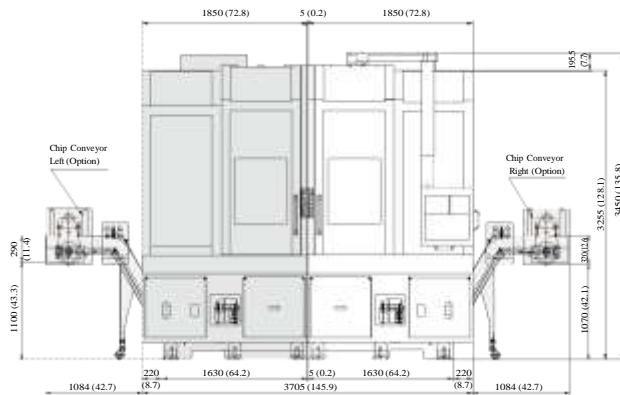
Unit: mm (inch)

PUMA VT750 / VT750M  
PUMA VT750-2SP / VT750M-2SP

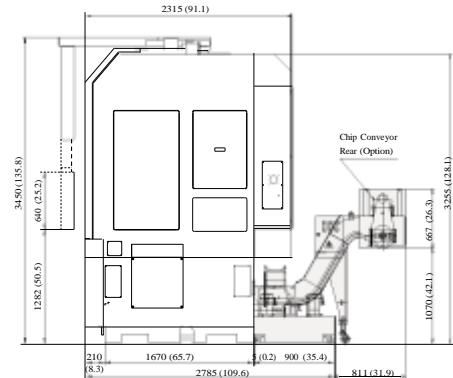
## Top View



### Front View



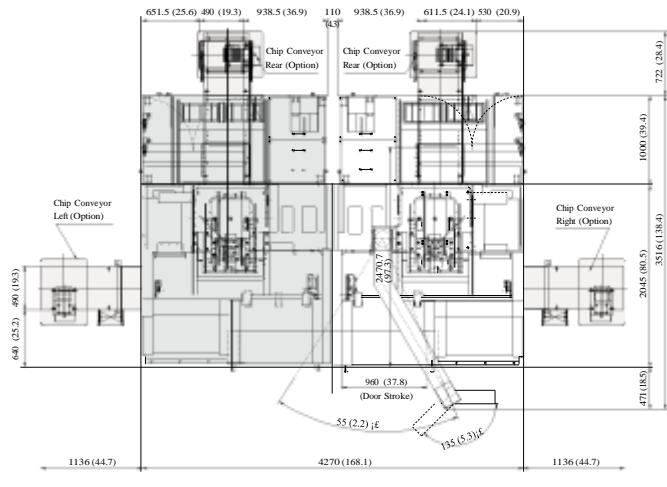
### Side View



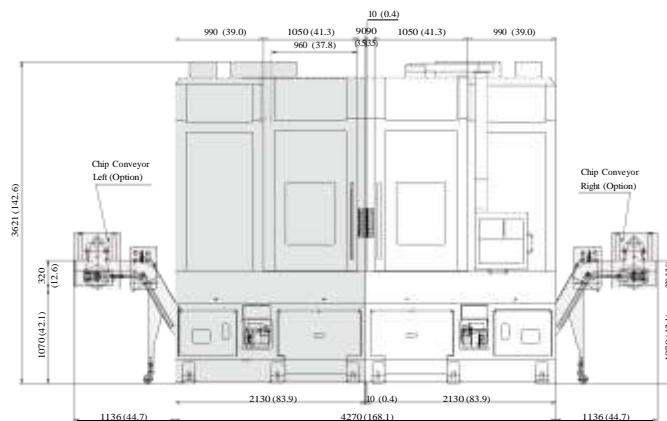
# External Dimensions

## PUMA VT900 / VT900M PUMA VT900-2SP / VT900M-2SP

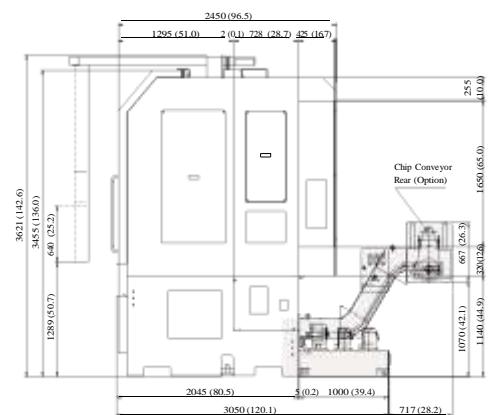
Top View



Front View

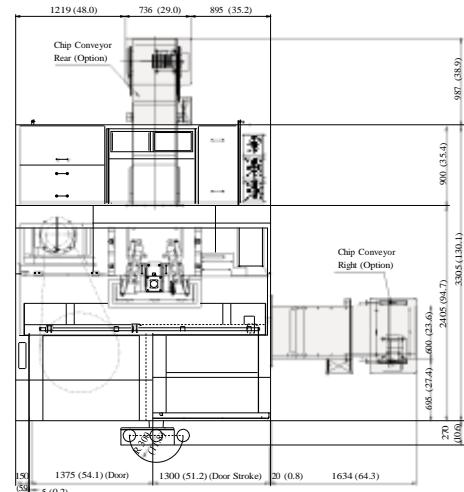


Side View

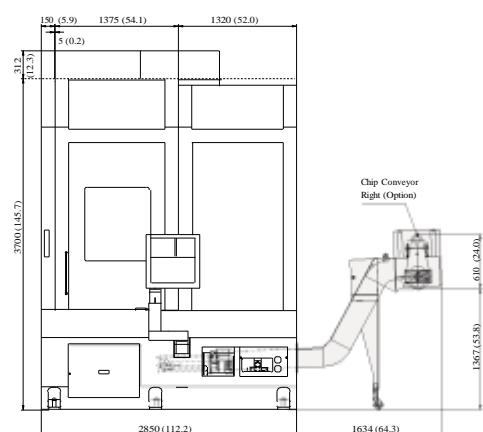


## PUMA VT1100 / VT1100M Top View

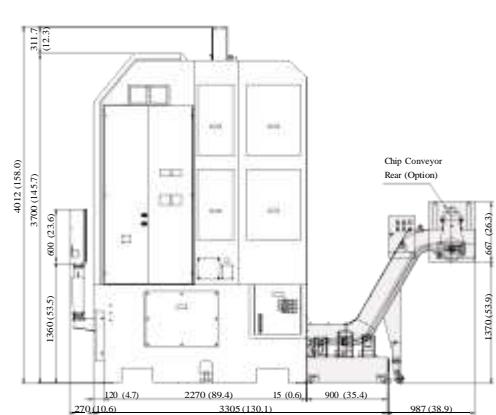
Top View



Front View



Side View



# Machine Specifications

| Description  |   | Unit      | PUMA VT450                              | PUMA VT450-2SP  | PUMA VT450M              | PUMA VT450M-2SP                         | PUMA VT750               | PUMA VT750-2SP  | PUMA VT750M              | PUMA VT750M-2SP |  |  |  |  |  |
|--------------|---|-----------|---|-----------------|--------------------------|---|--------------------------|-----------------|--------------------------|-----------------|--|--|--|--|--|
| Capacity     | Swing over bed                          | mm (inch) | 580 (22.8)                              |                 |                          | 800 (31.5)                              |                          |                 |                          |                 |  |  |  |  |  |
|              | Swing over saddle                       | mm (inch) | 450 (17.7)                              |                 |                          | 610 (24.0)                              |                          |                 |                          |                 |  |  |  |  |  |
|              | Recom. turning diameter                 | mm (inch) | 380 (15.0)                              |                 |                          | 450 (17.7)                              |                          |                 |                          |                 |  |  |  |  |  |
|              | Max. turning diameter                   | mm (inch) | 450 (17.7)                              |                 |                          | 750 (29.5)                              |                          |                 |                          |                 |  |  |  |  |  |
|              | Max. turning length                     | mm (inch) | 450 (17.7)                              |                 |                          | 760 (29.9)                              |                          |                 |                          |                 |  |  |  |  |  |
|              | Chuck size                              | mm (inch) | 305 (12)                                |                 |                          | 380 (15)                                |                          |                 |                          |                 |  |  |  |  |  |
| Travels      | X-axis                                  | mm (inch) | 240 (9.4)                               |                 |                          | 385 (15.2)                              |                          |                 |                          |                 |  |  |  |  |  |
|              | Z-axis                                  | mm (inch) | 450 (17.7)                              |                 |                          | 760 (29.9)                              |                          |                 |                          |                 |  |  |  |  |  |
| Feedrates    | Rapid traverse rate                     | X-axis    | m/min                                   | 20 (787.4)      |                          |   |                          |                 |                          |                 |  |  |  |  |  |
|              |   | Z-axis    | m/min                                   | 20 (787.4)      |                          |   |                          |                 |                          |                 |  |  |  |  |  |
| Main Spindle | Spindle speed                           | r/min     | 2500                                    |                 |                          | 2000                                    |                          |                 |                          |                 |  |  |  |  |  |
|              | Spindle nose                            | ASA       | A2#8                                    |                 |                          | A2#11                                   |                          |                 |                          |                 |  |  |  |  |  |
|              | Spindle bearing diameter (Front)        | mm (inch) | 120 (4.7)                               |                 |                          | 160 (6.3)                               |                          |                 |                          |                 |  |  |  |  |  |
|              | Spindle through hole                    | mm (inch) | 62 (2.4)                                |                 |                          | 77 (3.0)                                |                          |                 |                          |                 |  |  |  |  |  |
|              | Main spindle indexing angle (C-axis)    | deg       | -                                       | 360 (in 0.001)  |                          |   | -                        | 360 (in 0.001)  |                          |                 |  |  |  |  |  |
| Turret       | No. of tool stations                    | st        | 12                                      |                 |                          |   |                          |                 |                          |                 |  |  |  |  |  |
|              | OD tool size                            | mm (inch) | 25 (1.0)                                |                 |                          |   |                          |                 |                          |                 |  |  |  |  |  |
|              | Max. boring bar size                    | mm (inch) | $\phi 50$ ( $\phi 2.0$ )                |                 | $\phi 40$ ( $\phi 1.6$ ) |   | $\phi 50$ ( $\phi 2.0$ ) |                 | $\phi 60$ ( $\phi 2.4$ ) |                 |  |  |  |  |  |
|              | Turret Indexing time (1 station swivel) | s         | 1.6                                     |                 | 1.2                      |   | 1.8                      |                 | 1.4                      |                 |  |  |  |  |  |
| Motor        | Main spindle motor                      | kW (Hp)   | 22 (29.5) [15min.] {26 (34.9) [30min.]} |                 |                          | 30 (40.2) [30min.] {37 (49.6) [30min.]} |                          |                 |                          |                 |  |  |  |  |  |
|              | Servo motor X/Z-axis                    | kW (Hp)   | 3.0 / 4.0 (4.0 / 5.4)                   |                 |                          |   |                          |                 |                          |                 |  |  |  |  |  |
| Power source | Rotary tool spindle motor               | kW (Hp)   | -                                       | 4.5 (6.0)       |                          |   | -                        | 7.0 (9.4)       |                          |                 |  |  |  |  |  |
|              | Electric power supply (rated capacity)  | kVA       | 50 {55}                                 | 95 {105}        | 55 {60}                  | 100 {110}                               | 55 {65}                  | 105 {125}       | 60 {70}                  | 115 {140}       |  |  |  |  |  |
| Machine Size | Height                                  | mm (inch) | 3009 (118.5)                            |                 |                          | 3450 (135.8)                            |                          |                 |                          |                 |  |  |  |  |  |
|              | Length                                  | mm (inch) | 1445 (56.9)                             | 2895 (114.0)    | 1445 (56.9)              | 2895 (114.0)                            | 1850 (72.8)              | 3705 (145.9)    | 1850 (72.8)              | 3705 (145.9)    |  |  |  |  |  |
|              | Width                                   | mm (inch) | 2491 (98.1)                             |                 |                          | 2785 (109.6)                            |                          |                 |                          |                 |  |  |  |  |  |
|              | Weight                                  | kg (lb)   | 6200 (13668.5)                          | 12400 (27336.9) | 6200 (13668.5)           | 12400 (27336.9)                         | 9700 (21384.5)           | 19400 (42769.0) | 9700 (21384.5)           | 19400 (42769.0) |  |  |  |  |  |
| Controller   | Fanuc i series                          |           | Fanuc 31i                               | Fanuc i series  | Fanuc 31i                | Fanuc i series                          | Fanuc 31i                | Fanuc i series  | Fanuc 31i                |                 |  |  |  |  |  |

{ } : Option

## Standard Feature

- Coolant flushing for bed
- Coolant flushing for chuck
- Coolant supply equipment
- Full enclosure chip and coolant shield
- Hydraulic chuck & actuating cylinder
- Hand tool kit, including small hand tool for operations
- Hydraulic power unit
- Leveling jack screw & plates
- Lubrication equipment
- Soft jaws
- Standard tooling kit (tool holders & boring sleeve & U-Drill sleeve)
- Work light

## Optional Feature

- Air blast for chuck jaw cleaning
- Automatic door with safety device
- Chip bucket
- Coolant gun
- Drill socket
- Dual chucking pressure
- Hardened & ground jaws
- High pressure coolant
- Manual tool presetter (Removable type)
- Oil skimmer (Belt type)
- Proximity switch for chuck clamp detection
- Signal tower (yellow, red, green)
- Special chucks
- Straddle tool preparation (Piping & Solenoid valve, Exclude straddle tool)

• The specifications and information above-mentioned may be changed without prior notice.  
 • For more details, please contact Doosan.

# Machine Specifications

| Description  |   | Unit      | PUMA VT900            | PUMA VT900-2SP  | PUMA VT900M           | PUMA VT900M-2SP | PUMA VT1100     | PUMA VT1100M   |  |
|--------------|---|-----------|-----------------------|-----------------|-----------------------|-----------------|-----------------|----------------|--|
| Capacity     | Swing over bed                          | mm (inch) | 1000 (39.4)           |                 | 1270 (50.0)           |                 |                 |                |  |
|              | Swing over saddle                       | mm (inch) | 700 (27.6)            |                 | 1000 (39.4)           |                 |                 |                |  |
|              | Recom. turning diameter                 | mm (inch) | 610 (24.0)            |                 | 800 (31.5)            |                 |                 |                |  |
|              | Max. turning diameter                   | mm (inch) | 900 (35.4)            |                 | 1100 (43.3)           |                 |                 |                |  |
|              | Max. turning length                     | mm (inch) | 850 (33.5)            |                 | 1000 (39.4)           |                 |                 |                |  |
|              | Chuck size                              | mm (inch) | 609 (24)              |                 | 800 (32)              |                 |                 |                |  |
| Travels      | X-axis                                  | mm (inch) | 470 (18.5)            |                 | 580 (22.8)            |                 |                 |                |  |
|              | Z-axis                                  | mm (inch) | 850 (33.5)            |                 | 1000 (39.4)           |                 |                 |                |  |
| Feedrates    | Rapid traverse rate                     | X-axis    | m/min                 | 20 (787.4)      |                       |                 |                 |                |  |
|              |   | Z-axis    | m/min                 | 20 (787.4)      |                       |                 |                 |                |  |
| Main Spindle | Spindle speed                           | r/min     | 1800                  |                 | 850                   |                 |                 |                |  |
|              | Spindle nose                            | ASA       | ISO 702-1 A2#15       |                 | ISO 702-4-No15        |                 |                 |                |  |
|              | Spindle bearing diameter (Front)        | mm (inch) | 200 (7.9)             |                 |                       |                 |                 |                |  |
|              | Spindle through hole                    | mm (inch) | 107 (4.2)             |                 | 100 (3.9)             |                 |                 |                |  |
|              | Main spindle indexing angle (C-axis)    | deg       | -/-                   |                 | 360 (in 0.001)        | -/-             |                 | 360 (in 0.001) |  |
| Turret       | No. of tool stations                    | st        | 12                    |                 |                       |                 |                 |                |  |
|              | OD tool size                            | mm (inch) | 32 (1.3)              |                 |                       |                 |                 |                |  |
|              | Max. boring bar size                    | mm (inch) | ø80 (ø3.1)            |                 |                       |                 |                 |                |  |
|              | Turret Indexing time (1 station swivel) | s         | 2.0                   |                 | 1.6                   | 2.2             |                 |                |  |
| Motor        | Main spindle motor                      | kW (Hp)   | 45 (60.3) [30min.]    |                 | 60 (80.5) [10min.]    |                 |                 |                |  |
|              | Servo motor X/Z-axis                    | kW (Hp)   | 4.0 / 4.0 (5.4 / 5.4) |                 | 4.0 / 7.0 (5.4 / 9.4) |                 |                 |                |  |
|              | Rotary tool spindle motor               | kW (Hp)   | -/-                   |                 | 7.0 (9.4)             | -/-             |                 | 11 (14.8)      |  |
| Power source | Electric power supply (rated capacity)  | kVA       | 75                    | 145             | 80                    | 155             | 90              | 100            |  |
| Machine Size | Height                                  | mm (inch) | 3621 (142.6)          |                 | 4012 (158.0)          |                 |                 |                |  |
|              | Length                                  | mm (inch) | 2130 (83.9)           | 4270 (168.1)    | 2130 (83.9)           | 4270 (168.1)    | 2850 (112.2)    |                |  |
|              | Width                                   | mm (inch) | 3050 (120.1)          |                 | 3305 (130.1)          |                 |                 |                |  |
|              | Weight                                  | kg (lb)   | 12500 (27557.4)       | 25000 (55114.8) | 12500 (27557.4)       | 25000 (55114.8) | 22000 (48501.0) |                |  |
| Controller   |   |           | Fanuc 32i             | Fanuc 31i       | Fanuc 32i             | Fanuc 31i       | Fanuc 32i       |                |  |

## Standard Feature

- Coolant flushing for bed
- Coolant flushing for chuck
- Coolant supply equipment
- Full enclosure chip and coolant shield
- Hydraulic chuck & actuating cylinder
- Hand tool kit, including small hand tool for operationst
- Hydraulic power unit
- Leveling jack screw & plates
- Lubrication equipment
- Soft jaws
- Standard tooling kit (tool holders & boring sleeve & U-Drill sleeve)
- Work light

## Optional Feature

- Air blast for chuck jaw cleaning
- Automatic door with safety device
- Chip bucket
- Coolant gun
- Drill socket
- Dual chucking pressure
- Hardened & ground jaws
- High pressure coolant
- Manual tool presetter (Removable type)
- Oil skimmer (Belt type)
- Chuck clamp confirmation
- Signal tower (yellow, red, green)
- Special chucks
- Straddle tool preparation (Piping & Solenoid valve, Exclude straddle tool)

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# NC Unit Specifications

| Item                          |  | Spec.                            | Doosan              | Fanuc i series      | Fanuc 32i           | Fanuc 31i           |
|-------------------------------|--|----------------------------------|---------------------|---------------------|---------------------|---------------------|
| Controls                      | Controlled axes  |                                  |                     | X, Z, C (!)         | X, Z, C (!)         | X1, Z1, X2, Z2      |
|                               | Simultaneously controlled axes   | Std. 2 axes                      |                     | 4 axes (!)          | 3 axes (!)          | 4 axes              |
| Axis Functions                | Backlash compensation  | 0~9999 pulses                    | ○                   | ○                   | ○                   | -                   |
|                               | Cs contouring control  |                                  | ○(!)                | ○(!)                | ○(!)                | -                   |
|                               | Follow-up / Chamfering on/off  |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | HRV2 control   |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | Least input increment  | 0.001mm / 0.0001"                | ○                   | ○                   | ○                   | ○                   |
|                               | Stored stroke check1   | Overtravel control               | ○                   | ○                   | ○                   | ○                   |
|                               | Automatic operation(memory) / Buffer register                                |                                  | ○                   | ○                   | ○                   | ○                   |
| Operation                     | Handle incremental feed  | X1, X10, X100                    | ○                   | ○                   | ○                   | ○                   |
|                               | Search function  | Sequence NO. / Program NO.       | ○                   | ○                   | ○                   | ○                   |
|                               | 1st, reference position return   | Manual, G28                      | ○                   | ○                   | ○                   | ○                   |
| Interpolation                 | 2nd reference position return  | G30                              | ○                   | ○                   | ○                   | ○                   |
|                               | Reference position return check  | G27                              | ○                   | ○                   | ○                   | ○                   |
|                               | Circular interpolation   | G02                              | ○                   | ○                   | ○                   | ○                   |
|                               | Continuous thread cutting  |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | Dwell  | G04                              | ○                   | ○                   | ○                   | ○                   |
|                               | Linear interpolation   | G01                              | ○                   | ○                   | ○                   | ○                   |
|                               | Multiple threading / Thread cutting retract                                  |                                  | ○                   | ○                   | ○                   | ○                   |
| Feed Functions                | Polar coordinate interpolation   |                                  | ○(!)                | ○(!)                | ○(!)                | -                   |
|                               | Thread cutting / Synchronous cutting   |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | Feed per minute / Feed per revolution  |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | Feedrate override  | 0 - 200% (10% unit)              | ○                   | ○                   | ○                   | ○                   |
| Auxiliary & Spindle Functions | Jog feed override  | 0 - 2000 mm/min                  | ○                   | ○                   | ○                   | ○                   |
|                               | Rapid traverse override  | F0/ 25 / 100%                    | ○                   | ○                   | ○                   | ○                   |
|                               | Tangential speed constant control  |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | 1st Spindle orientation  |                                  | ○                   | ○                   | ○                   | ○                   |
| Programming Functions         | Constant surface speed control   |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | M-function   | M3 digit                         | ○                   | ○                   | ○                   | ○                   |
|                               | Multi-spindle control  |                                  | ○(!)                | ○(!)                | ○(!)                | ○                   |
|                               | Rigid tapping  |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | Spindle speed override   | 0~150%                           | ○                   | ○                   | ○                   | ○                   |
|                               | Absolute / Incremental programming   |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | Canned cycle for drilling / turning  |                                  | ○                   | ○                   | ○                   | ○                   |
| Tool Functions                | Custom macro   |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | Decimal point programming / pocket calculator type decimal point programming |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | Direct drawing dimension programming   |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | Manual guide i   | Conversational programming       | ○                   | ○                   | ○                   | ○                   |
|                               | Maximum program dimension  | ±9 digits                        | ○                   | ○                   | ○                   | ○                   |
|                               | Multi repetitive canned cycle  | G70~G76                          | ○(!)                | ○                   | ○                   | ○                   |
|                               | Optional block skip(without hardware)  | Total 9 (Only NC function)       | -                   | ○                   | ○                   | ○                   |
|                               | Sequence number  |                                  | N5                  | N8                  | N8                  | N8                  |
|                               | Programmable data input  | G10                              | ○                   | ○                   | ○                   | ○                   |
|                               | Sub program call   | Nested holds                     | 4                   | 10                  | 10                  | 10                  |
| Editing Op. Functions         | Tape format for FANUC series 10/11   |                                  | ○                   | ○                   | -                   | -                   |
|                               | Tape format for FANUC series 15  |                                  | -                   | -                   | -                   | ○                   |
|                               | Work coordinate system selection   | G52~G59                          | ○                   | ○                   | ○                   | ○                   |
|                               | Auto tool offset   |                                  | ○                   | ○                   | ○                   | ○                   |
| Setting & Display             | Tool monitoring system   |                                  | -                   | Opt.                | Opt.                | Opt.                |
|                               | Direct input of tool offset value measured B                                 |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | Tool geometry / wear compensation  | Geometry & wear data             | ○                   | ○                   | ○                   | ○                   |
|                               | Tool life management   |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | Tool nose radius compensation  | G40~G42                          | ○                   | ○                   | ○                   | ○                   |
|                               | T-code function  | T2+2 digits                      | ○                   | ○                   | ○                   | ○                   |
|                               | Tool offset pairs  |                                  | 64                  | 64                  | 32                  | 32                  |
| Data Input & Output           | Tool offset value counter input  |                                  | -                   | ○                   | ○                   | ○                   |
|                               | Background editting  |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | Expanded part program editting   | Copy, Move, Change of NC program | ○                   | ○                   | ○                   | ○                   |
|                               | No. of Registered programs   |                                  | 400ea               | 500ea               | 500ea               | 500ea               |
|                               | Part program editing / Program protect                                       |                                  | ○                   | ○                   | ○                   | ○                   |
| Other Functions               | Part program storage length <sup>*1</sup>                                    |                                  | 1280m               | 640m                | 640m                | 640m                |
|                               | Display of spindle speed and T-code at all screen                            |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | Help function  | Alarm&Operation display          | ○                   | ○                   | ○                   | ○                   |
|                               | Self diagnostic function   |                                  | ○                   | ○                   | ○                   | ○                   |
| PMC system                    | Servo setting screen / Spindle setting screen                                |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | Tool path graphic display  |                                  | ○                   | Opt. (!)            | ○                   | ○                   |
|                               | Ethernet function  | RS-232C                          | ○                   | ○                   | ○                   | ○                   |
| Memory card input and output  | Memory card input and output   |                                  | ○                   | ○                   | ○                   | ○                   |
|                               | Reader puncher control   | CH1 interface                    | ○                   | ○                   | ○                   | ○                   |
| MDI / DISPLAY unit            | Ethernet function  | Embedded ethernet function       | ○                   | ○                   | ○                   | ○                   |
|                               | MDI / DISPLAY unit   |                                  | 10.4" color TFT LCD |
|                               | PMC system   |                                  | ○                   | ○                   | ○                   | ○                   |

\*1 : Standard Part program length is different on export condition. On the addition of optional functions, its length can be reduced.  
○: Standard OPT : Option (!) : only M type



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## Doosan Machine Tools

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